ABSTRACT

A solid oxide fuel cell is formed by arranging a fuel electrode layer and an air electrode layer on both surfaces of a solid electrolyte, respectively, a fuel electrode current collector and an air electrode current collector outside the fuel electrode layer and the air electrode layer, respectively, and separators (8) outside the fuel electrode current collector and the air electrode current collector. In the first embodiment, a fuel gas and an oxidant gas are supplied from the separators (8) to the fuel electrode layers and the oxidant electrode layers, respectively, through the fuel electrode current collectors and the air electrode current collectors, respectively. Each separator (8) is formed by laminating a plurality of thin metal plates at least including a thin metal plate (21) in which a first gas discharge opening (25) is arranged in the central part and second gas discharge openings (24) are circularly arranged in the peripheral part, and a thin metal plate (22) with an indented surface. The weight saving of the electric power generation cell can be achieved, and the gases discharged from the separators (8) can be supplied to the whole areas of the electrode layers through the current collectors, so that an efficient electric power generation satisfactory in gas utilization ratio can be carried out. In the second embodiment, indents (8a) are provided on the surface of each of the separators (8), which surface is in contact with one of the current collectors (6), to increase the dwell volume and hence the retaining time of the gas in the interior

of the current collectors. Thus, the gases permeate the interior of the current collectors slowly and are spread over the whole area of the current collectors, so that a satisfactory gas reaction can be carried out over the whole area of the electrode layers. Thus, the reaction time between the electrode layers and the gases can be made longer to thereby improve the electricity generation performance of the solid oxide fuel cell.